



PATENT
27622-2

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: KEITH, ET AL Conf.: 9045
Appl. No.: 10/820,992 Art Unit: 3643
Filed: 04/08/2004 Examiner: PARSLEY, David J.
For: IMPROVED ACCURACY LESS LETHAL
PROJECTILE

Declaration OF Jaime H. Cuadros

I, Jaime H. Cuadros, hereby state as follows:

1. I am one of the inventors and applicants of the above identified patent application.
2. The less-lethal projectile described in the patent application has improved accuracy over those of the prior art, due to the bore-rider stabilizer attached directly to the rear of the projectile.
3. The improved accuracy comes from the new bore-rider stabilizer, which provides two improvements to the old generic less-lethal bag projectile design.
 - a. The loss of accuracy in the vertical plane comes from the variation of exit velocity of a projectile caused by variation on the friction of the projectile and the gun barrel. The new low coefficient of friction bore rider, upon firing of the projectile, provides a lower and more consistent friction between the projectile and the gun barrel. This action produces a more uniform exit velocity from shot to shot. More uniform velocity reduces the variability of the droop of the projectile, all other variables being equal.

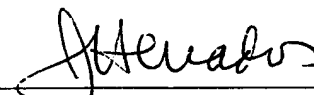
- b. The loss of accuracy in any other plane comes from aerodynamic forces acting unevenly on the flying projectile. The result is a larger impact area at the target for any number of shots. The new stabilizer improves the accuracy by equalizing the aerodynamic forces and transmitting the corrections necessary to the body of the projectile through the stiff petals of the stabilizer. The projectile is mass stabilized (no spinning) but any small deviations caused by aerodynamic forces are quickly corrected, before their small effect is amplified during the flight to target.

4. The gain in accuracy was demonstrated during the development testing of this projectile. The results of these tests are summarized on Table 1 (page 226) of my paper entitled "Improvements in Aerodynamic Design for KE Less-Lethal Projectiles," presented at the 22nd Ballistic International Symposium in Vancouver, BC, Canada, 14-18 November 2005.

5. The table shows the improvement in accuracy from a standard less-lethal bag projectile (ALS Power Punch) from impacting inside of a circle of 5 inches in diameter, to the new design QT-4 projectile impacting inside a 2.1-inch circle, all other variables being the same.

6. This accuracy comes at the cost of more parts and more time required to assemble the projectile. The sale price is about \$2.50 higher for the QT-4 projectile. However, the users are willing to pay the cost difference to get the improved accuracy, as shown in the attached copies of invoices showing the sale price difference.

Dated: October 16, 2006



Jaime H. Cuadros

MK BALLISTIC SYSTEMS

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PACKING LIST

TOTAL DUE

\$0.00

Salesperson MK
FEIN 77-0273619
Invoice date 8/9/2006
Customer ID SID HEAL LASO
Terms
Date shipped August 15, 2006
Shipped via UPS GROUND
FOB
Prepaid / Collect
Tax exempt
Reason
Exemption no.

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SOLD TO

Name
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Address (line 2)
City, State or Prov.
Postal code, count
Phone
Fax
Company name

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Attn: P. KAUFMAN
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City, State or Prov. STATE COLLEGE, PA
Zip code, Country 16801
Company name

Please make checks payable to:

MK BALLISTIC SYSTEMS
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HOLLISTER, CA 95024

REF NO.	QTY	DESCRIPTION	PRICE EACH	TOTAL
	10	FLEXIBLE BATON-12 CLOSE RANGE P/N 4000		
	10	FLEXIBLE BATON STANDARD P/N 4020		
	10	FLEXIBLE BATON STD- DYE MARKING P/N 4030		
	10	AERO-SOCK P/N 4023		
	10	AERO-DRAG STABILIZED TRAINING P/N 4025		
	10	QT-4 AERO SOCK P/N 4024		
	10	QT-4 AERO SOCK LEAD FREE P/N 4026		
	10	RB-2 RUBBER BATON P/N 4700		
	10	RB-2 -LV P/N 4710		
	10	RB-12 RUBBER PELLET P/N 4800		

THANKYOU FOR YOUR ORDER

SUBTOTAL

EXCISE TAX 11.00%

SHIPPING & HANDLING

PAYMENT

PLEASE PAY THIS AMOUNT

INTEREST OF 1.5% PER MONTH IS DUE IF PAYMENT IS MADE AFTER THE DUE DATE.

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INVOICE

TOTAL DUE \$2,100.00

Salesperson MK
FEIN 77-0273619
Invoice date 1/5/2006
Customer ID P.O.# N00164-06-P-0093
Terms 30 DAYS
Date shipped January 05, 2006
Shipped via UPS GROUND
FOB
Prepaid / Collect
Tax exempt
Reason
Exemption no.

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Company name ATTN: DENNIS JONES

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MK BALLISTIC SYSTEMS
P.O. BOX 1097
HOLLISTER, CA 95024

REF NO:	QTY	DESCRIPTION	PRICE EACH	TOTAL
0001	200	#4026 NON-LEAD/ NON-LETHAL AERO SOCK BEAN BAG, 300 FPS RDS	5.25	1,050.00
0002	200	#4027 NON-LEAD/ NON-LETHAL AERO SOCK BEAN BAG, 350 FPS RDS	5.25	1,050.00
ORDER COMPLETE				

THANKYOU FOR YOUR ORDER

SUBTOTAL	\$2,100.00
EXCISE TAX 11.00%	
SHIPPING & HANDLING	N/C
PAYMENT	
PLEASE PAY THIS AMOUNT	\$2,100.00

INTEREST OF 1.5% PER MONTH IS DUE IF PAYMENT IS MADE AFTER THE DUE DATE.